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Educational assortative mating and couples' linked late-life employment trajectories

Mark Visser [a,*], **Anette Eva Fasang** [b]

[a] Radboud University, Department of Sociology, P.O. Box 9104, 6500 HE Nijmegen, the Netherlands

[b] Humboldt University of Berlin, Department of Social Sciences & WZB Berlin Social Science Center, Unter den Linden 6, 10099 Berlin, Germany

E-mail addresses: m.visser@maw.ru.nl (M. Visser), anette.fasang@hu-berlin.de (A.E. Fasang)

Abstract

In the context of population aging and growing numbers of older workers and older couples, this study examines how educational assortative mating earlier in life is associated with the division of paid work later in life between partners of opposite-sex couples in the Netherlands. We observe 20 years of linked couples' employment trajectories, when the male partners were aged 45 to 65. This longitudinal and dyadic perspective enables us to examine long-term patterns in couples' division of paid work, including the timing of retirement, beyond snapshots of the division of paid work between partners at specific ages. We consider labor supply and labor demand factors for older workers in connection to cumulative (dis)advantage over the life course and argue that educational assortative mating earlier in life reinforces social inequality between couples later in life. We innovatively apply multichannel sequence and cluster analysis using retrospective data from four waves of the Family Survey Dutch Population (FSDP) for the 1916 to 1957 birth cohorts. Findings support a typology of five groups of older couples: 1) high-status dual-earners, 2) low-status dual-earners, 3) high-status male breadwinners, 4) low-status male breadwinners and 5) dual-jobless/disabled couples. The male breadwinner clusters are more prevalent overall (53 percent), but even among these relatively old birth cohorts, a substantial share of couples is in a long-term, stable dual-earner arrangement later in life (41 percent). The majority of dual-earner couples consists of two high-status earners (24 percent). Multinomial logistic regression analysis supports that educational assortative mating earlier in life is associated with a polarization into resource-rich high-status dual-earners and resource-poor low-status male breadwinner couples later in life. We conclude that educational assortative mating sets in processes of cumulative advantage and disadvantage over the life course that leave an enduring imprint on couples' linked late-life employment trajectories.

Key words: couples; division of labor; educational assortative mating; life course; retirement; sequence analysis

Introduction

The Dutch government, along with other Western countries, has primarily responded to population aging by discouraging early retirement and raising the state pension age. As a result, labor force participation of older people has increased since the 1990s, with a particularly rapid rise in the employment of older women (Statistics Netherlands, 2017). As the majority of the growing group of older workers is married, individual late-life employment trajectories are often embedded in couples and spouses' financial and subjective well-being depend on one another (Madero-Cabib & Fasang, 2016).

This study takes a dynamic and dyadic perspective on couples' late-life employment trajectories of individuals born between 1916 and 1957. To the best of our knowledge, it is the first study to examine couples' linked employment trajectories over a long time span (20 years between age 45 and 65 of the male partner) for both partners of opposite-sex couples. This long-term perspective is important because the employment status of both partners may vary considerably in old age, leading to different constellations of employment and non-employment at different ages. Comparing older couples only at specific ages therefore provides snapshots that potentially obscure dominant long-term patterns of the division of market work between partners in later life. Moreover, the stability or volatility of older couples' division of market work is of interest in itself. The analyses focus on couples' division of paid work, that is, who is employed and who is not, including retirement transitions. For those who are employed, occupational class based on the Erikson-Goldthorpe-Portocarero (EGP) class scheme is considered as an indicator of socio-economic status. Higher-status jobs are generally characterized by higher wages, more work autonomy, better working conditions and less supervisory responsibilities, at least compared to lower-status jobs (Erikson & Goldthorpe, 1992). In addition, occupational class is less affected by short-term career fluctuations than income and, therefore, better suited as an indicator of long-term labor market position and prospects (Grunow & Aisenbrey, 2016). Occupational class is thus an important indicator of socio-economic inequality between older couples.

We address two research questions. First, we aim to fill a deficit of descriptive evidence about how couples' linked late-life employment trajectories unfold over time and ask: *Which types of linked late-life employment trajectories exist for older couples in the Netherlands?* The analyses build on rich retrospective data from the Family Survey Dutch Population (FSDP) (Kraaykamp, Wolbers, & Ruiter, 2009) and an innovative application of multichannel sequence and cluster analysis (Gauthier, Widmer, Bucher, & Notredame, 2010) to create a typology of partners' linked employment trajectories. Second, we ask: *How are partners' education and educational assortative mating associated with their linked late-life employment trajectories?* According to the notion of cumulative (dis)advantage (Dannefer, 2003; DiPrete & Eirich, 2006), resources of couples (e.g., income or wealth) tend to accumulate over the life course partly due to educational homogamy, which may lead to greater social inequality between couples than within couples (Verbakel, Luijkx, & De Graaf, 2008). Couple characteristics, such as educational assortative mating early in life, may leave enduring imprints on subsequent life

courses and reinforce a concentration of high- versus low-status employment, or even non-employment, in older couples (Bernasco, De Graaf, & Ultee, 1998). This would exacerbate inequality between older couples, but remain unnoticed in purely individual-level analyses. We thus employ a life course perspective to study how long-term employment trajectories are shaped by earlier life events in the context of 'linked lives' of spouses (Elder, Johnson, & Crosnoe, 2003), with special attention to educational homogamy.

We aim to contribute to two strands of literature. First, we add to the understanding of couples' late-life employment and their retirement timing. Few studies adopted a life course perspective on joint retirement (e.g., Blau, 1998; Denaeghel, Mortelmans, & Borghgraef, 2011; Henretta, O'Rand, & Chan, 1993; Ho & Raymo, 2009; Szinovacz & DeViney, 2000) and most life course studies on retirement timing assessed how midlife experiences affect the timing of either men's or women's retirement (Damman, Henkens, & Kalmijn, 2011, 2015; Finch, 2014; Hank, 2004; Madero-Cabib, Gauthier, & Le Goff, 2015; Raymo, Warren, Sweeney, Hauser, & Ho, 2010). These studies did not examine both partners simultaneously and disregarded long-term employment trajectories by isolating retirement transitions, which is at odds with the central theoretical importance of long-term trajectories in the life course paradigm (Elder, et al., 2003). Moreover, multiple shifts between employment and non-employment before retirement are prevalent (Calvo, Madero-Cabib, & Staudinger, 2017; Fasang, 2012). This study fills a gap in the literature by taking a dynamic and dyadic perspective on couples' linked late-life employment trajectories. Our study shows that only a small minority of couples in our sample retires jointly (about 3 percent of couples retire within one year of each other). Yet, joint retirement is most common among two highly educated, high-status dual-earning spouses in later life.

Second, we add new evidence on the role of educational assortative mating for the gendered division of paid (and unpaid) work between partners. Most theoretical arguments and empirical studies on the division of labor in couples are restricted to earlier life stages, women or both, that is, women in earlier life stages, usually in the presence of young children (e.g., Bernasco, et al., 1998; Han & Moen, 1999; Kühhirt, 2012; Langner, 2015; Pienta, Burr, & Mutchler, 1994; Stier, Lewin-Epstein, & Braun, 2001). Some research has looked into changes in the division of household labor after retirement (Leopold & Skopek, 2015, 2016; Szinovacz, 2000), whereas to our knowledge no studies have examined the division of market work among older couples over relatively long windows of time. Despite increasing attention to such dynamics, to date, we have a limited understanding of older couples' employment trajectories up to and including retirement. Instead of unpaid work, this study focuses on the division of market work among older couples to assess the potential accumulation of advantage and disadvantage resulting from educational assortative mating earlier in life.

The Dutch context

Before proceeding to the data and results, we first describe relevant labor market institutions and retirement policies for our study cohorts in the Netherlands and lay out our theoretical rationale. Our

study includes men born between 1916 and 1944 (mean=1935) and women born between 1921 and 1957 (mean=1939), reflecting the usual age difference between men and women in heterosexual couples. They experienced their active family formation phase and established careers (or not) roughly between 1945 and 1985 and retired between 1980 and 2000. Overall, both absolute and relative educational homogamy is quite strong in the Netherlands as a result of partner preferences and marriage market constraints (Kalmijn & Uunk, 2015).

The Netherlands is usually classified as a hybrid of the corporatist and social democratic welfare state with strong conservative roots (Arts & Gelissen, 2002). Until about 1970, strong Christian religious institutions and norms suppressed female employment in the Netherlands by advocating traditional family values, which also kept fertility rates high. Particularly in the 1950s, prevailing norms disapproved of working mothers and to a lesser extent of working women in general. National policies reinforced the traditional male breadwinner model from the 1950s to the late-1980s. For example, the tax system favored single- over dual-earner couples until 1988 (Hendrickx, Bernasco, & De Graaf, 2001). The institutional and normative environment – especially before 1970 – discouraged women to re-enter the labor market after marriage and childbirth and fostered economic dependence on their husbands. Especially the employment careers of women born before 1940 were affected by these circumstances. This environment favored a traditional career path for the majority of men in our study, that is, completing education, working full-time and retiring well before the age of 65.

Secularization, women's emancipation and the expansion of the service sector increased education and labor market participation of women in the 1960s and 1970s, which affected women born after 1940 in our sample. Part-time work became increasingly available, enabling mothers to combine work and family to a greater extent. Accordingly, the prevalence of dual-earner couples increased since the 1970s (Van Gils & Kraaykamp, 2008), although Dutch couples are often characterized as one-and-a-half earners because part-time employment is widespread among women (Blossfeld & Hakim, 1997). Female labor force participation and family formation continue to be strongly intertwined. Mothers still tend to reduce working hours after the birth of their first child, especially if they obtained a higher secondary or lower vocational degree (Begall & Grunow, 2015), whereas fathers do not (Fouarge, Manzoni, Muffels, & Luijkx, 2010). Since the 1990s, public child care facilities and parental leave policies facilitate combining work and parenthood (Uunk, Kalmijn, & Muffels, 2005). However, our study cohorts are largely unaffected by these policies, because they were implemented after their active family formation phase. Men's employment careers have also changed in the past decades. Particularly since the 1970s, globalization, deindustrialization and labor market flexibilization have led to more uncertainty, volatility and non-standard forms of employment, including part-time, temporary and self-employment (Luijkx, Kalmijn, & Muffels, 2006). Male blue-collar occupations suffered more in response to globalization and economic restructuring, whereas typically female jobs in the service sector expanded during the later years of our cohorts' working lives.

Concerning pension policies, for older couples in our sample, generous early retirement schemes, as negotiated in collective labor agreements, were available in their late career. These early retirement schemes dominated the retirement context in the Netherlands. Especially men born before 1950 and across all educational levels heavily used early retirement options (Visser, Gesthuizen, Kraaykamp, & Wolbers, 2016b). For lower educated men, these schemes granted social safety nets, which protected them against unemployment and guaranteed a source of income until the state pension age of 65. Women were also eligible for these early exit schemes. However, due to the low employment rate of older generations of women, few women made use of the option to retire early. Furthermore, many women worked part-time and had discontinued and shorter employment careers than men, which lowered their pension entitlements (Van Oorschot, 2007).

Disability schemes were also a lucrative way to exit the labor market early, in particular for older men who were not able to continue working due to health reasons. These disability schemes were quite easily accessible, also for relatively healthy older workers, yet mostly used by lower educated workers (Visser, et al., 2016b). Entitlement conditions for the disability schemes were generally regarded as non-restrictive and highly flexible, with income replacement rates of about 80 percent (Schils, 2008). Even unemployment was regarded as a substitute pathway into retirement, although it was used less often than the early retirement and disability schemes. Older age groups in the Netherlands take the most sick leave (approximately 6 percent of all days that an employee was available in the last year) and older women, on average, take more and longer sick leave than older men (Statistics Netherlands, 2017). According to the sick leave law, Dutch employers are required to continue to pay at least 70 percent of the wage for two years. After this period, the disability regulations become relevant. Early retirement schemes were gradually abolished as of the mid-1990s and the eligibility criteria for disability schemes became stricter, encouraging older workers to remain in the workforce. This should be apparent among more 'recent' birth cohorts (i.e., after 1950), which we hardly observe.

In sum, the Netherlands is an interesting case for studying the association between educational assortative mating earlier in life and couples' linked employment trajectories later in life for several reasons. First, educational homogamy is strong in the Netherlands. Second, as outlined above, the Dutch context for our study cohorts provides an interesting combination of relatively traditional gender norms, social democratic labor market institutions and generous early retirement policies. The division of market work between partners may still be strongly gendered, irrespective of educational homogamy, due to protective welfare state institutions and gender-traditional norms that carry over into couples' division of paid work later in life.

Theory and hypotheses

Several mechanisms potentially connect education and educational assortative mating earlier in life to couples' division of paid labor in later life. We first briefly lay out theoretical arguments on couples'

division of labor irrespective of age, followed by a discussion about the division of paid work among older couples and the possible role of educational assortative mating. Although our empirical analysis cannot test the causal mechanisms at work in a strict sense, we build on these theoretical arguments to establish plausible theoretical links between educational assortative mating earlier in life and couples' late-life employment trajectories that inform the interpretation of our findings.

Specialization and resource-bargaining are prominent theoretical arguments on couples' division of labor irrespective of age. Specialization assumes that couples maximize a joint utility function through a traditional gender-specific division of labor (Becker, 1981). The partner who has a comparative advantage in paid work because of higher education and corresponding earnings potential specializes in market work, whereas the other partner withdraws from the labor market to specialize in domestic work (Becker, 1964). In contrast, the resource-bargaining approach assumes that partners constantly (re-)negotiate the division of work, seeking to maximize their individual utility (Blossfeld & Drobnič, 2001; Cook & Emerson, 1978; Lundberg & Pollak, 1994). A comparative advantage in paid work translates into higher bargaining power in the relationship, which can be used to demand lesser participation in domestic work and lead to labor market withdrawal of the other partner. When one partner is higher educated than the other, both specialization and bargaining approaches suggest stronger labor force attachment of the higher educated partner. For educationally homogamous couples, resource-bargaining would suggest a more equal division of market work (and other tasks) compared to heterogamous couples.

Specialization and resource-bargaining are presented as theoretical mechanisms that determine couples' division of labor irrespective of age. However, they were initially developed with heterosexual young adult couples with young children in mind, who face particularly high demands on their time for market work and family care. Moreover, recent empirical evidence suggests that gendered norms about appropriate male- and female-specific behavior often trump rational choice-based predictions as formulated in the specialization and resource-bargaining approach (e.g., Nitsche & Grunow, 2016). Moreover, higher educated individuals, on average, hold more egalitarian gender norms (Esping-Andersen & Billari, 2015). Whether specialization and resource-bargaining would even theoretically apply equally well to older couples is debatable. Older couples typically no longer provide care for young children in the household and have no need to work long hours to establish careers. Instead, other factors likely gain relevance for older couples' division of market work. First, older workers face specific labor supply and demand dynamics that depend on couples' relative and absolute education. Second, for older couples, divisions of labor established early in life, partly in response to educational assortative mating, potentially set in path-dependencies that may have enduring effects on couples' division of paid work later in life.

Labor supply factors include older adults' preferences for and physical ability to do paid work, both of which likely differ across education levels. Both partners might develop stronger preferences for work when competing demands on their time decrease after the intensive child care years are over.

Note that family care might continue to be relevant, especially in the presence of grandchildren and in countries with limited public child care provision (Bordone, Arpino, & Aassve, 2017). Nevertheless, highly educated homogamous couples can be expected to prefer dual-earning in old age compared to lower educated couples for several reasons. First, given their previous investments in education and their high earnings potential, both partners individually have strong incentives to work (Becker, 1964). Even if highly educated women interrupt employment for family reasons, their incentives to re-enter employment in midlife would be stronger compared to lower educated women, because they face higher opportunity costs of non-employment. There are many high-quality part-time jobs available in the Netherlands, which should weaken the impact of childbirth on employment withdrawal of, in particular, higher educated women (Fouarge, et al., 2010). Furthermore, it has been shown that the wages of part-time jobs are not far below full-time jobs in the Netherlands (Fouarge & Muffels, 2009). Higher educated women with only short family interruptions should be particularly likely to increase labor force participation in old age, as for them, skill depreciation that would depress future earnings potential is less severe (Aisenbrey, Evertsson, & Grunow, 2009). Second, jobs with high skill demands tend to be more rewarding and provide more autonomy in addition to higher pay, which would further increase preferences to continue to work or return to work in older adulthood for higher educated men and women. Third, more gender-egalitarian values among the highly educated in the Netherlands (André, Gesthuizen, & Scheepers, 2012) also support a stronger preference for dual-earning among highly educated homogamous couples compared to lower educated couples. Finally, couples' may seek to coordinate their retirement timing and either prefer to both keep working or to both retire at the same moment to enjoy leisure time together (Ho & Raymo, 2009).

Concerning older workers' physical ability to work, health issues obviously tend to decrease older workers' labor supply to a greater extent than for younger workers. This holds particularly true for lower educated older adults who more often have occupational histories in physically strenuous and dangerous jobs coupled with risky health behaviors, including smoking and alcohol consumption (Van Rijn, Robroek, Brouwer, & Burdorf, 2014). The elevated likelihood of lower educated older workers to drop out of the labor force prematurely and involuntarily due to health reasons is well documented (for the Netherlands, see Visser, Gesthuizen, Kraaykamp, & Wolbers, 2016a). Either their partners can compensate for the lack of a disabled partner's income by increasing their own labor supply or they are forced to withdraw from the labor market to provide care for their disabled spouse. Increasing labor supply is likely more common among the highly educated who can then afford to outsource care, whereas decreasing labor supply to provide care will be more common among lower educated couples who cannot afford professional care.

Labor demand factors that affect older couples' division of paid labor include the availability of jobs and retirement options for older men and women with different educational levels. Older workers' options to return to or remain in the labor market in later life varies with initial and continued human capital acquisition as well as skill depreciation through employment interruptions over the life

course (Visser, et al., 2016a). A single-earner strategy – as suggested by the specialization approach – could be too risky for couples when the breadwinner's income is low or insecure (Oppenheimer, 1997). In times of economic adversity, older couples with little human capital and low earnings potential may have difficulties to make ends meet. Economic downturns, skill-biased technological change and deindustrialization particularly affected older men in blue-collar occupations in mining, production and manufacturing. At the same time, typical female occupations in the service sector expanded, potentially providing opportunities for lower educated older women (Kollmeyer & Pichler, 2013). The increasing demand for labor in female-dominated industries thus increased women's earnings opportunities along with their opportunity costs of remaining out of the labor force (Pettit & Hook, 2005).

When employment opportunities are scarce or unattractive, thus pushing older workers out of the labor market, pull factors of old-age pensions, disability and unemployment benefits play a crucial role for retirement (Ebbinghaus, 2006). As noted above, extensive early retirement options existed for our study cohorts. Older men were more likely to make use of those options than older women. Regarding educational differences in early retirement behavior in the Netherlands, prior research found that lower educated older workers are more likely than older workers who graduated from university to exit the labor market, particularly through the disability schemes and to a lesser extent through the early retirement schemes (Visser, et al., 2016a). It is thus expected that especially lower educated men used the disability schemes to retire prematurely, whereas educational disparities with regard to the early retirement schemes are less pronounced.

Educational assortative mating and couples' division of market work over the life course

Educational assortative mating can affect couples' initial division of labor (Blossfeld & Timm, 2003; Verbakel, et al., 2008) and sets the stage for their later division of paid work. In fact, recent evidence suggests that increasing economic inequality is not primarily related to an increase in educational homogamy, which has always been strong. Instead, changing labor force behavior after marriage, particularly an increase in highly educated women's labor supply, has led to increasing economic inequality (Gonalons-Pons & Schwartz, 2017). This shifts the attention from meeting and matching processes between partners to their subsequent division of labor over the life course as the decisive inequality-generating mechanism.

According to specialization and bargaining approaches, comparative advantage in paid work of one partner fosters single breadwinner arrangements. This is most likely when educational assortative mating is weak and highly educated individuals tend to be married to lower educated spouses. Conversely, a comparative advantage is less pronounced within couples when educational assortative mating is strong. In the extreme case of complete homogamy, where everybody is married to someone with the exact same educational level, there would be no comparative advantage in paid work within couples based on education. We therefore assume a higher prevalence of dual-earning among

homogamous couples, in which comparative advantage in paid work is weaker, compared to educationally heterogamous couples. However, other factors than educational homogamy come into play to determine couples' division of labor over the life course (Gonalons-Pons & Schwartz, 2017), including employment opportunities and gender norms. We therefore particularly expect dual-earning among highly educated homogamous couples due to their higher earnings potential, better employment opportunities and more gender-egalitarian norms.

In principle, divisions of labor established early in life can develop over the life course in three ways: persistence, change or accumulation/reinforcement. To date, research on the stability and change of couples' division of paid work over the life course has strongly focused on the impact of crucial life events, prominently the transition to parenthood (e.g., Kühhirt, 2012; Langner, 2015). The findings support a more traditional division of paid labor after the birth of the first child, even among previously gender-egalitarian couples. The extent to which persistence, change or reinforcement of a given division of labor between partners occurs will depend on the labor supply and demand dynamics discussed above. Importantly, given the division of labor early in life, options for change might be quite different. For instance, in dual-earner couples, there might be more leverage for one person to reduce work at an older age (if their financial situation allows it). Contrastingly, a single-earner division of market work early in life could be strongly carried over into late adulthood, because the non-working partner may find it impossible to re-enter the labor market after substantial periods out of the labor force due to skill depreciation and limited job opportunities. The couple would thus be highly dependent on the single earner, who might further increase working hours to prepare for retirement (reinforcement). If persistence and reinforcement of initial single- and dual-earner arrangements is strong, and the initial division of labor is related to educational assortative mating, strong educational homogamy earlier in life leads to cumulative advantage and disadvantage between couples over the life course (Dannefer, 2003; DiPrete & Eirich, 2006). Lower educated homogamous partners who opt for a single-earner strategy would rely on the lifetime income of one low-income earner, whereas higher educated homogamous partners would reinforce an initial economic advantage by accumulating two relatively high lifetime incomes, which also enables them to accrue more (occupational) pension savings (Knoef, et al., 2016; Van Duijn, Mastrogiacomo, Lindeboom, & Lundborg, 2013). However, this could have opposing effects on higher educated couples' labor supply. On the one hand, their accumulated wealth allows them to reduce their working hours or quit working altogether. On the other hand, they have a financial incentive to keep working and possibly high intrinsic motivations to continue working in rewarding jobs.

Precisely because a single-earner strategy might be increasingly risky for lower educated couples as they approach retirement (Oppenheimer, 1997), even couples with a gender-traditional specialization of paid work earlier in life may strive for dual-earning later in life. The increased insecurity of male blue-collar jobs, the health risks that go along with those jobs and the heightened importance of private pension savings in the Netherlands (Schils, 2008) could additionally foster

preferences for dual-earning among the lower educated in late adulthood. However, dual-earning may also be most difficult to realize for precisely those couples who need a second income the most. Lower educated men tend to earn lower wages with small(er) wage increases over the life course. In addition, labor market re-entry can be extremely difficult for women who have been out of the labor force for extended periods of time (Aisenbrey, et al., 2009), particularly when they have lower educational degrees and the value of their skills deteriorated over time. It therefore remains an open question whether lower educated couples can effectively pool incomes and to some extent compensate for lower initial earnings with a dual-earner strategy later in life, or continue to rely on one (modest) income as they approach retirement.

Summary of hypotheses

Both labor supply and demand factors vary with individual education and the combination of partners' educational levels. Work tends to be more rewarding, both financially and intrinsically, for the higher educated, which should increase their preferences for remaining in and returning to the labor force at older ages. Highly educated men and women also face better employment options in old age, especially if they did not suffer skill depreciation due to long periods out of the labor force (Damman, et al., 2011; Finch, 2014). Therefore, dual-earner trajectories would be most likely among two highly educated partners who both can expect higher intrinsic and extrinsic returns to education, have better employment opportunities and are healthy enough to keep working. More gender-egalitarian values would further encourage dual-earning among the highly educated. Remaining out of the labor force, often involuntarily (e.g., because of health reasons), would be more prevalent among the lower educated, whose opportunity costs of not engaging in paid work are lower and (attractive) employment opportunities are often lacking. Less egalitarian gender norms would further foster male breadwinner arrangements that leave those couples vulnerable to one relatively insecure income. Strong educational assortative mating would then contribute to lower economic inequality within older couples, but to higher economic inequality between older couples (Esping-Andersen, 2009; Lersch, 2017), with a polarization into highly educated dual-earners and lower educated single breadwinners in later life. An initial polarization into higher and lower educated couples as a result of educational assortative mating earlier in the life course could thus contribute to the accumulation of (dis)advantage across the life course and into old age.

Based on specialization as well as bargaining arguments and given the widespread comparative labor market advantage of older men compared to their female partners, we expect a high prevalence of male breadwinner couples later in life for our study cohorts in the Netherlands. Dual-earner (or even female breadwinner) trajectories in later life could be more prevalent among younger generations of female partners, who obtained higher educational degrees and accumulated more labor market experience. Based on both *labor supply* and *labor demand factors*, we hypothesize that highly educated homogamous couples are less likely to be in a male breadwinner arrangement (H1a) and

more likely to be dual-earners in later life (H1b) compared to all other joint employment trajectories than lower educated homogamous and educationally heterogamous couples. This would indicate cumulative advantage and disadvantage between higher and lower educated homogamous couples over the life course. Alternatively, lower educated older couples could strive to minimize economic risks as they approach retirement by opting for a dual-earner strategy later in life, if they are able to find employment and stay healthy. Contrary to the first hypotheses, this would suggest that lower educated homogamous couples are less likely to be in a male breadwinner arrangement (H2a) and more likely to be dual-earners in later life (H2b) compared to all other joint late-life employment trajectories than highly educated homogamous couples and educationally heterogamous couples.

Methods

Data

We use pooled data from four waves (1998, 2000, 2003 and 2009) of the Family Survey Dutch Population (FSDP). Random probability samples were drawn from the population of Dutch-speaking people in the Netherlands. Within households, both the primary respondent (between age 18 and 70) and his or her partner (if available) are interviewed face-to-face. A unique feature of the survey is that entire employment histories of both partners were collected retrospectively. Response rates vary between 40.6 percent (2000) and 52.6 percent (2003). Married and cohabiting individuals were intentionally oversampled in each wave, which led to an overrepresentation of older respondents because they are married and cohabiting more often than younger people. This is an advantage in the context of our study that focuses on older couples. The samples are representative of gender and educational level. For additional information about the sampling procedure, response rates and questionnaire, see Kraaykamp, Wolbers and Ruiter (2009).

The initial pooled sample consisted of 9033 men and women of 18 years and older. The first selection of men aged 65 years and older reduces the sample to 407 older men. Respondents have to be observed until at least age 65 (the mandatory retirement age at that time) to ensure that we can observe complete employment trajectories from age 45 to 65. We then restricted the sample to men in a stable heterosexual relationship between age 45 and 65, excluding men in a same-sex couple (N=3), single men (N=21), men with non-interviewed partners (N=5), and separation and re-partnering processes in later life (N=18 widowed; N=13 separated/divorced; N=37 re-partnered) due to insufficient case numbers to include them in the analysis in a meaningful way. For the large majority of the remaining 310 men in stable marriages from age 45 to 65 (95 percent), the current marriage is their first marriage. Women's trajectories are linked to their male partner's age to make sure that partners' joint trajectories refer to the same time period. That means we chose the male partners' age as the timeline on which couples' linked employment trajectories are observed. This enables an in-depth analysis of longitudinal dyadic trajectories for the sub-group of stable older couples. The sample is a couple-period file that contains monthly information on the employment status for both partners of

310 opposite-sex couples. All couples happen to be married, which is plausible as marriage is widespread among these birth cohorts. Representative national figures for our study cohorts show that 80 percent of older people are married, 10 percent are widowed and about 5 percent each are unmarried or divorced (see also Table A1 in the online supplementary material). Our sample thus reflects a large proportion of the elderly population in the Netherlands. To our knowledge, the FSDP data is the only data source that allows a dyadic analysis of couples' joint long-term employment trajectories in the Netherlands based on occupational class.[1]

Measurements

Education is measured at the couple level and refers to the highest educational level obtained, consisting of the categories: neither partner highly educated (low absolute education), both partners highly educated (high absolute education), male partner highly educated (male comparative advantage) and female partner highly education (female comparative advantage). This categorization allows us to test our hypotheses in one analysis. Higher education is measured as lower and higher vocational education or a university degree. Among these relatively old birth cohorts, the completion of lower vocational education can be considered highly educated. We considered a number of other categorizations of education that provided too little variation in the data.[2] Again, note that we are interested in the total effect of education and are not able to adjudicate the underlying theoretical mechanisms that connect education to couples' employment trajectories in later life.

We include several control variables that are related to a comparative advantage, bargaining power and gender role attitudes. Unfortunately, we do not have a reliable indicator of health prior to the observation period.[3] The age difference between partners is measured by dummy variables for no age difference (within a range of 2 years), male partner is more than 2 years older and female partner is more than 2 years older. We also add the female partner's year of birth as gender ideologies are more egalitarian and less traditional for younger generations of women (Fortin, 2005). Religiosity as an indicator of gender role attitudes is assessed by the question: 'Do you consider yourself as belonging to any particular religion or denomination?'. If both partners (most couples) or one of the partners (very few couples) answered yes, they are coded as religious. If both partners answered no, they are non-religious. There is too little variation to separate denominations as most respondents reported that they are either Catholic or Protestant. We include women's age of the current marriage as a continuous variable, given that all couples in our sample are married.[4] The age of the youngest (or last) child at the moment of the survey consists of the categories youngest age tertile, medium age tertile and oldest age tertile, complemented by dummy variables for the number of children.[5] Less traditional women postpone marriage and parenthood to establish careers (Langner, 2015). Hence, male breadwinner arrangements would be less likely among older couples with no or few children or who had children late. Finally, we include four dichotomous parental education variables: husband's father highly educated, husband's mother highly educated, wife's father highly educated and wife's mother highly

educated. The completion of secondary education is considered highly educated for the parents of our respondents because education was much more selective for them than for their children. We assume that individuals who have highly educated parents are more likely to hold less traditional gender role attitudes net of their own education.

Multichannel sequence analysis

To identify couples' linked employment trajectories in later life, we applied multichannel sequence analysis (MCSA) (Gauthier, et al., 2010; Madero-Cabib & Fasang, 2016; Pollock, 2007) with the TraMineR package in R (Gabadinho, Ritschard, Studer, & Müller, 2009). A key strength of MCSA is that it enables the simultaneous analysis of longitudinal employment data for both partners, whereas the findings of cross-sectional methods would strongly depend on the specific age at which partners are observed. Combined with powerful visualization techniques, MCSA offers a systematic view of partners' linked employment trajectories and how they develop over time.

The male and female employment trajectory each constitute one 'channel' of the dyadic couple trajectory. A trajectory is a sequence of monthly states, a combination of employment status and EGP class. The EGP scheme is a multidimensional measure of occupational status, which is determined by education, the type of work, job authority and job autonomy (Erikson & Goldthorpe, 1992). In contrast to income or hourly wages, occupational class is less sensitive to short-term career fluctuations and, therefore, a more reliable long-term indicator of labor market position and prospects (Grunow & Aisenbrey, 2016). In addition, occupational class also considers non-monetary job rewards, such as authority and autonomy, which are important indicators of job quality that signify socio-economic inequality beyond income. We distinguish the following states: (I) higher professional, (II) lower professional, (III) non-manual worker, (IV) self-employed, (V) higher working class, (VI) skilled manual worker, (VII) unskilled manual worker, unemployed, disabled, early retired and inactive.[6]

MCSA calculates the similarity between couples by comparing all couples with each other. Two couples are regarded as similar when the two male partners as well as the two female partners have similar employment trajectories, whereas similarity within couples is irrelevant. We thus group couples with a similar division of labor and identify types of couples' linked late-life employment trajectories. Optimal Matching (OM), with user-defined substitution costs and insertion-deletion ('indels') costs of half the maximum substitution cost, is used to calculate a distance matrix (Aisenbrey & Fasang, 2010; MacIndoe & Abbott, 2004). This matrix summarizes the degree of dissimilarity between older couples' joint employment trajectories. The substitution costs take into account the hierarchy of occupational classes, that is, the absolute difference between EGP classes. For instance, EGP I is more similar to EGP II than EGP V. All non-employment states are seen as less similar to employment compared to EGP classes among each other (see the cost matrix in Table A2 in the online supplementary material).[7]

Ward cluster analysis was performed on the distance matrix. Based on relatively high values of the Average Silhouette Width (ASW=0.31) and the Point Biserial Correlation (PBC=0.55), a five cluster solution is identified as the optimal grouping that shows a clear local maximum on both cut-off criteria (Studer, 2013). The five clusters include: 1) 'high-status dual-earners', 2) 'low-status dual-earners', 3) 'high-status male breadwinner couples', 4) 'low-status male breadwinner couples' and 5) 'dual-jobless/disabled couples'.

Results

Descriptive findings

Table 1 provides descriptive information for the analysis sample. As expected, educational assortative mating is strong: 70 percent of older couples are educationally homogamous. Among more than half of the couples (53 percent), neither partner is highly educated, whereas in 17 percent of couples, both partners are highly educated. Among the educationally heterogamous couples, men are higher educated in 24 percent of couples, against 7 percent in which women are higher educated. About 65 percent of couples are religious and the majority (42.3 percent) has two children. Lastly, men tend to be older than their wives (73.2 percent).

[Table 1 about here]

Figure 1 shows sequence index plots of the five clusters of older couples' linked employment trajectories. Each horizontal line represents a sequence of employment states (a trajectory) for an individual. Employment states are represented by different colors. Men's trajectories are shown on the left and those of their wives on the right. Each line on the left and right side represents the same couple. Within the clusters, both the male and female sequence of a couple are sorted by the husband's retirement timing. Note that we prioritize the joint dynamic of partners' trajectories by sorting their trajectories according to the same time line. Obviously, patterns in the female trajectories would be more immediately visible if we sorted them by female retirement timing. However, we would then lose the ability to place couples on a joint time line and to display wives' trajectories concurrent to their husbands' trajectories. We also discuss results displayed in Tables 2 and 3, which contain additional information about the clusters.

[Figure 1 about here]

The male breadwinner model – represented by two clusters in the middle of Figure 1 – is most common among older couples overall (53 percent). However, even among our relatively old study cohorts in the Netherlands, 41 percent are dual-earners in later life, while 7 percent show a pattern of

persistent dual-joblessness. In addition, couples' division of paid work tends to be highly stable in later life, with few changes in dominant patterns of employment and non-employment among spouses.

The first cluster, 'high-status dual-earners', is shown at the top of Figure 1. This group accounts for 24 percent of couples. The most common occupations for men are higher (EGP I) and lower professionals (EGP II), with on average 6.5 and 5 years spent in these occupations in the observation periods, respectively. Women are mostly lower professionals (EGP II) and non-manual workers (EGP III), with on average almost 4.5 and more than 8.5 years spent in these states in the observation period, respectively (see Table 2). Early retirement, indicated by the dark blue color, around age 60 is the norm for men in this group. Men in this group, on average, retire at age 60.7 (Table 3). Women, on average, work longer than their husbands. Only about 20 percent of men are still working at age 65 compared to 50 percent of their wives who still work when their husbands turn 65. Joint retirement is most common in this group, in which 11 percent of couples retire within 1 year from each other. Consistent with the opportunity cost argument, employment for women in this group slightly increases with age as they return from family leave to work in relatively high-status occupations.

Cluster 2, 'low-status dual-earners', comprises 17 percent of couples. However, dual-earning remains more prevalent among the couples with more resources in cluster 1. In cluster 2, husbands are mostly employed in working-class jobs (EGP V to VII). Their female partners are predominantly in non-manual occupations, although they spend the most time, on average, in unskilled manual occupations (EGP VI). There is more variation in retirement timing among men in the low-status dual-earner group compared to men in the high-status dual-earners cluster as can be seen from a higher standard deviation around the mean retirement age of men in cluster 2 (see Table 3). Also, on average, men in this group retire at an earlier age (58.9).

[Table 2 about here]

Cluster 3, 'high-status male breadwinner couples' (26 percent), consists of men in high EGP classes, which is also confirmed by Table 2. Their wives are inactive throughout later life. Cluster 4, low-status male breadwinners (27 percent) comprises men in low EGP classes (again confirmed by Table 2) and continuously inactive women. Retirement timing among men in the low- and high-status male breadwinner groups corresponds largely to their high- and low-status dual-earner peers, which is also apparent from Table 3. Finally, nearly 7 percent of couples' employment trajectories in later life are characterized by dual-joblessness/disability (bottom of Figure 1). In this cluster, women are again inactive throughout later life, while their husbands left the labor market by age 50 and are disabled from that age onwards. On average, men in this cluster are disabled for 12 years later in life.

Overall, the low-status dual-earners cluster suggests that economic necessity may play a role for dual-earning among older couples with few resources, which is in line with hypothesis 2. Finally, early retirement is common among older men in all clusters (varying between age 58 and 60). Early

retirement options were available across all occupational groups and men's retirement was affected by them in a similar way across occupations and thus to a certain extent across educational groups as well. The only exception are men in the dual-joblessness/disability cluster, who exited the labor force much earlier at a mean age of 50 years (see Table 3).

[Table 3 about here]

Multivariate findings

Table 4 provides the results of a multinomial logistic regression analysis, showing how educational assortative mating is associated with the likelihood to be in each of the five groups. We present average marginal effects, which reflect the likelihood of being in a specific cluster relative to all other clusters and thus provide estimates for each cluster.[8] This is different from a 'regular' multinomial logistic regression analysis in which no estimates are obtained for a chosen reference category. Note that the sum of the average marginal effects of an independent variable across all clusters equals 0. We test our hypotheses at a maximum alpha of 0.1 given the modest sample size, which is common in many longitudinal couple analyses (e.g., Nitsche & Grunow, 2016).

The results do not support the specialization and resource-bargaining approach. Older couples in which men enjoy an educational comparative advantage are not more likely to be a male breadwinner couple compared to couples in which neither partner is highly educated. Instead, they are more likely to be dual-earners in later life. When only the male partner is highly educated (versus neither partner highly educated), the relative probability of being in the low-status male breadwinner cluster relative to the probability of being in all other groups decreases by 15.8 percent, whereas the likelihood to be in the high-status dual-earner cluster increases by that percentage.

The findings lend stronger support to arguments based on educational homogamy. Highly educated older couples (i.e., both partners highly educated) are almost 35 percent less likely to be a low-status male breadwinner couple (H1a) and 24 percent more likely to be high-status dual-earners in later life (H1b) compared to couples in which both partners are lower educated. The same pattern holds true for couples in which only the husband is highly educated, although the effect sizes are smaller. Overall, these findings support that dual-earning is a common strategy among highly educated homogamous couples and couples in which only husbands are highly educated. Contrastingly, a (low-status) single-earner strategy is most common among the reference group of lower educated homogamous couples. The results therefore support a pattern of cumulative advantage and disadvantage in couples' linked employment trajectories over the life course that is related to educational assortative mating earlier in life. Over time, there is a polarization into higher educated homogamous couples who are high-status dual-earners throughout late adulthood and lower educated homogamous couples who are low-status male breadwinners in later life. The effects of the control variables are as expected, further strengthening confidence in our results. Couples who are not religious and in which women are born

more recently are more likely to be high-status dual-earners. Younger birth cohorts of women are also more likely to be low-status dual-earners, but less likely to sort into the high-status male breadwinner and dual-jobless/disability clusters.

[Table 4 about here]

Based on labor supply factors, we expected male breadwinner arrangements in later life to be less prevalent among lower educated couples (H2a), who would opt for dual-earner arrangements to minimize labor market risks and financially prepare for retirement (H2b). However, absolute education is not predictive of being in the low-status dual-earner cluster. Instead, lower educated couples are more likely to be a low-status male breadwinner couple compared to highly educated couples or heterogamous couples in which only men are highly educated. This is in line with labor demand considerations and fewer employment opportunities for lower educated older adults. We do find a low-status dual-earner group, which lends some support that a single-earner strategy is too risky for some couples in low-status occupations. However, low education is not the decisive driving force for sorting into the low-status dual-earner group. Employment opportunities for men and women with specific occupational qualifications are perhaps more decisive for being low-status dual-earners than their absolute level of education.

The remaining control variables add little explanatory power to the analysis. Most notably, family life variables, including the age of the current marriage and the number of children, do not show significant effects. Variation in these variables could be too low among our relatively homogeneous sample of continuously married couples. The multinomial logistic regression model accounts for 17.9 percent of the variation between couples in the types of late-life employment trajectories (pseudo R^2). Overall, the independent variables are least predictive of the dual-jobless/disability cluster. This is probably due to the fact that only 6.8 percent of the sample is in this cluster, which implies low statistical power and makes it difficult for the effects to reach statistical significance. In addition, we unfortunately lack indicators on health and occupational hazards earlier in the life course, which likely are crucial predictors of being in the dual-jobless/disability cluster.

Conclusions and discussion

This study contributes to the literature with a dynamic and dyadic perspective on the role of educational assortative mating for linked late-life employment trajectories of opposite-sex couples in the Netherlands. Using unique longitudinal couple data, we were able to jointly study full employment trajectories from age 45 to 65 of both partners of married couples. Specifically we showed that educational assortative mating earlier in life is associated with couples' division of paid labor later in life. Findings support an accumulation of (dis)advantage between couples. Highly educated homogamous couples are likely to be stable high-status dual-earners into late adulthood, whereas

lower educated homogamous couples are concentrated in low-status single breadwinner couples later in life.

Overall, men were the single breadwinner in later life in more than half of the couples. These older couples thus completely rely on his income, indicating strong economic dependence of women and corresponding gender inequality within these couples. Dual-earning was also relatively widespread (40 percent of older couples), which suggests that the division of paid work is more equal among a substantial share of older couples who were at the forefront of the expansion in women's education and employment in the second half of the twentieth century in the Netherlands. These couples can draw on two incomes in later life, which may contribute to social inequality between older couples relative to male breadwinner couples. However, high-status male breadwinner couples could still have a higher household income than low-status dual-earners. Future research should thus investigate income differentials between couples with different divisions of paid work using detailed longitudinal (prospective) income data. Furthermore, the degree of gender equality within older dual-earner couples should not be overstated based on our findings. Women in dual-earner couples likely still do the bulk of household labor, work part-time and earn substantially less than their male partners (Leopold & Skopek, 2015, 2016). Future studies should examine multiple dimensions of gender inequality within older couples in the Netherlands as well as other countries, such as income and time spent on household work.

Concerning the theoretical implications of this study, we found no support for the economic approach to the family (Becker, 1981). Both the specialization and bargaining approach predict that a male breadwinner model is especially likely when men have a comparative advantage over their partner in the labor market (Blossfeld & Drobnič, 2001). However, these theoretical rationales were developed for young adult couples with young children and may not be readily transferable to older couples, who face different labor supply and demand side dynamics. Our findings showed exactly the opposite to predictions derived from specialization and bargaining models among older couples in the Netherlands: highly educated couples and couples in which men hold a comparative advantage are more likely to be high-status dual-earners. Additionally, high-status dual-earners are more prevalent among younger birth cohorts of women and non-religious couples. Both factors are associated with more egalitarian gender role attitudes. This is in line with a growing body of evidence showing that gender role attitudes trump economic considerations when it comes to the division of labor among couples (e.g., Nitsche & Grunow, 2016). Our study further highlights the importance of educational homogamy for couples' late-life division of paid work. Importantly, educational assortative mating earlier in life exacerbates differences between higher and lower educated couples later in life, with a polarization into resource-rich high-status dual-earners and resource-poor low-status male breadwinners.

These educational differences in older couples' employment trajectories could, however, be overestimated as we were not able to control for health trajectories. In fact, one of the mechanisms

through which education operates and affects couples' division of paid work could be the educational gradient in health. More physically strenuous and dangerous jobs as well as more risky health behaviors among the lower educated are well documented and may limit their labor supply, particularly with increasing age (Van Rijn, et al., 2014). The strength of the FSDP data lies in the unique availability of full information about both partners' employment careers over a time span of 20 years, but it comes at the cost of excluding retrospective data on other life course dimensions, such as health. Part of the observed educational differences in the division of labor in later life could therefore be attributable to health differences between older couples.

Based on preferences for work, we discussed that lower educated couples may seek to pursue a dual-earner strategy in late adulthood to prepare for retirement, even if they were single-earners earlier in life, but we did not find support for this in the data. On the one hand, older workers with limited education and labor market experience may simply have few employment opportunities. Labor demand side factors would then prevent lower educated couples from dual-earning. On the other hand, the financial necessity argument, developed by Oppenheimer (1997), may not be fully applicable to the Dutch context. Despite recent austerity trends, vulnerable groups continue to be protected by social security, including disability, unemployment, and old-age benefits. The additional income of lower educated older women may provide little added value to the household's financial situation if her only option is to work in a low-paid job. We did find a low-status dual-earner group for whom financial necessity and the pooling of labor market risks between partners could be decisive (Oppenheimer, 1997), yet lower education was not an important predictor for sorting into this group. Future research should systematically compare welfare states to examine late-life employment trajectories of couples with different socio-economic backgrounds and the role of labor supply and demand considerations for their division of paid work in later life.

Finally, a non-negligible minority of couples' late-life employment trajectories is characterized by long-term dual-joblessness and/or disability (7 percent of older couples). Our analysis based on relatively detailed socio-demographic information was unable to predict which older couples are more likely to be in this disadvantaged group. Yet, the findings support that dual-jobless/disability in later life is not strongly stratified along some traditional lines of social inequality, that is, education and religion. However, we have to interpret these results with caution, as the number of older couples belonging to this cluster was quite low. Future studies should examine other factors, such as health and occupational hazards across the life course, preferably with larger sample sizes for this subgroup.

This study examined linked late-life employment trajectories of older birth cohorts. It remains to be seen how the changing nature of work and family (e.g., women's rising education and earnings potential, higher divorce rates and lower fertility rates) and policies that encourage longer working lives will affect couples' division of paid work and the role of educational assortative mating of younger birth cohorts. On the one hand, educational assortative mating has increased among younger birth cohorts as women have matched, and even surpassed, men's educational attainment (Kalmijn &

Uunk, 2015). In addition educational homogamy might be increasingly tightly linked to differential divisions of labor after marriage (Gonalons-Pons & Schwartz, 2017). This could further exacerbate a polarization of couples into resource-rich dual-earners and resource-poor single-earners. On the other hand, both employment and family trajectories are more volatile among younger birth cohorts, with increased risks of separation and stepfamily formation (Thomson, 2014). As a result, single-earner strategies become even more risky to secure economic well-being over the life course and may therefore become less prevalent overall. Recent retirement reforms, prominently the abolition of early retirement schemes and the increase in state pension age, may further contribute to this development (Visser, et al., 2016a). As population aging continues and is predicted to peak halfway through this century, late-life employment trajectories and how they are embedded in couples will remain high on political and research agendas.

Notes

1. Other data sources, such as SHARELIFE, might provide more information on, for instance, health. However, SHARELIFE does not include information on occupational class, but only retrospective income information. The proportion of missing values on the retrospective income information is prohibitively high and the low reliability of retrospective income measures is well documented (Mayer, 2008).
2. We also tried coding higher vocational and university education as highly educated. However, there is not enough variation across the clusters to include this measure in the multivariate analysis. We provide a cross-tabulation between this measurement of education and the clusters online in Table A3. Including individual measures of education was also not feasible because of multicollinearity, which is not surprising given the high degree of educational homogamy in our sample. We would also be unable to examine the effect of partners' relative education.
3. Another important control variable that we tried to include in the multivariate analysis is health. Health was only measured at the moment of the survey. We refrained from using this measure due to likely reversed causality. Instead, we tried to add a proxy for health by adding a dichotomous variable that indicates whether at least one partner experienced at least one disability spell before the start of the observation period (i.e., before age 45). Unfortunately, there is not sufficient variation across the clusters to include previous disability episodes in the multivariate analysis. See also Table A4 in the online supplementary material.
4. All couples in our sample are continuously married between age 45 and 65, but there are a few partners that remarried before age 45. However, the number of remarriages is too low to take into account in the measurement of female partner's marital age. Although this may have consequences for couples' late-life employment trajectories (e.g., in case of a divorce), we decided to keep these couples in the data because otherwise it would further reduce the already small sample size.
5. Because there were a few remarriages, there were also some partners with non-biological children. For those cases, the age of the youngest child refers to the last born child of the female partner. Arguably, the birth of a child is more important in determining women's than men's employment trajectories (in later life). Furthermore, most partners mention the same number of children because they count non-biological children as their own. Finally, distinguishing biological and non-biological children would mean that we could not add the child variables as couple characteristics, which is a problem given that our units of analysis are couples.
6. We also considered using weekly working hours as part of the employment states, but there is little variation both within and between older couples in working hours and the inequality component is less substantive compared to occupational class.
7. The cluster solution is robust to other cost specifications, such as the default value of 2 for all the substitution costs. Using substitution costs based on transition rates was not feasible.

8. Alternatively, we conducted five logistic regression analyses to estimate the probability of being in each of the five clusters relative to being in all other clusters. The results are available online (see Table A5) and are nearly identical to the results presented here. In addition, Tables A6 to A9 in the online supplementary material show the results of logistic regression analyses of all combinations of clusters. Owing to the small number of couples in this cluster, none of the models with the dual-jobless/disability cluster could identify.

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Tables and figures

Table 1: Descriptive statistics (N=310)

	Range	Mean	S.D.
Late-life employment clusters			
High-status dual-earners	0/1	0.232	
Low-status dual-earners	0/1	0.165	
High-status male breadwinner	0/1	0.261	
Low-status male breadwinner	0/1	0.274	
Dual-jobless/disability	0/1	0.068	
Educational level			
Neither highly educated	0/1	0.526	
Both highly educated	0/1	0.165	
Only male highly educated	0/1	0.239	
Only female highly educated	0/1	0.071	
Birth year female	1921-1957	1938.752	6.340
Non-religious couple	0/1	0.348	
Age difference			
Equal age	0/1	0.226	
Male older	0/1	0.732	
Female older	0/1	0.042	
Age youngest child	13-49	34.065	5.117
Youngest tertile	0/1	0.348	
Medium tertile	0/1	0.323	
Oldest tertile	0/1	0.290	
Children			
No children	0/1	0.039	
One child	0/1	0.100	
Two children	0/1	0.423	
Three children	0/1	0.277	
More than three children	0/1	0.161	
Age of current marriage female	16-58	24.232	5.228
Parental education			
Male’s father highly educated	0/1	0.410	
Male’s mother highly educated	0/1	0.252	
Female’s father highly educated	0/1	0.410	
Female’s mother highly educated	0/1	0.284	

Source: FSDP 1998, 2000, 2003 and 2009.

Table 2: Average number of months spent in each state per cluster

	High-status dual-earners		Low-status dual-earners		High-status male breadwinner		Low-status male breadwinner		Dual-jobless/ disability	
	Husband	Wife	Husband	Wife	Husband	Wife	Husband	Wife	Husband	Wife
Inactive	0	21	5	39	0	231	0	234	0	217
Unemployed	2	0	1	0	5	6	2	0	9	0
Disabled	4	4	23	8	7	3	9	3	140	9
Early retired	35	15	43	8	34	0	37	3	56	13
Unskilled manual worker	3	2	71	57	0	0	87	0	0	0
Skilled manual workers	0	0	31	10	2	0	46	0	6	0
Higher working class	17	3	31	2	2	0	32	0	2	0
Self-employed	18	27	6	31	9	0	23	0	0	0
Non-manual worker	24	104	5	47	51	0	1	0	2	0
Lower professional	60	53	12	30	57	0	3	0	13	1
Higher professional	78	11	13	8	74	0	0	0	12	0
Total	240	240	240	240	240	240	240	240	240	240

Source: FSDP 1998, 2000, 2003 and 2009.

Table 3: Average retirement timing and prevalence of joint retirement per cluster

	Average retirement age men	S.D.	N men	Average retirement age women	S.D.	N women	% joint retirement
High-status dual-earners	60.735	2.171	50	59.616	2.142	23	11.1
Low-status dual-earners	58.931	2.493	30	58.208	4.033	6	2.0
High-status male breadwinner	60.474	2.028	51	n/a	n/a	n/a	0.0
Low-status male breadwinner	59.312	2.525	46	52.667	17.442	2	0.0
Dual-jobless/disability	50.441	6.777	7	55.875	11.490	2	0.0
Total	59.621	3.211	184	58.712	4.770	33	2.9

Note: joint retirement refers to partners who retire within one year of each other.
Source: FSDP 1998, 2000, 2003 and 2009.

Table 4: Multinomial logistic regression analysis of couples' late-life employment trajectories, average marginal effects (N=310)

	High-status dual-earners	Low-status dual-earners	High-status male breadwinner	Low-status male breadwinner	Dual-jobless/ disability
Educational level					
Neither highly educated	ref.	ref.	ref.	ref.	ref.
Both highly educated	0.244 ***	0.019	0.135 ~	-0.349 **	-0.049
Only male highly educated	0.158 **	-0.063	0.076	-0.158 **	-0.012
Only female highly educated	0.048	0.005	0.066	-0.162	0.044
Birth year female	0.013 **	0.008 *	-0.015 ***	-0.001	-0.005 ~
Non-religious couple	0.093 *	0.024	-0.022	-0.092 ~	-0.003
Age difference					
Equal age	ref.	ref.	ref.	ref.	ref.
Male older	0.054	0.118 ~	0.009	-0.120 *	-0.061 ~
Female older	-0.064	0.245 *	-0.235	0.050	0.004
Age youngest child					
Youngest tertile	-0.100	-0.023	-0.016	0.105 ~	0.034
Medium tertile	ref.	ref.	ref.	ref.	ref.
Oldest tertile	0.058	-0.014	0.040	-0.078	-0.006
Number of children					
No children	ref.	ref.	ref.	ref.	ref.
One child	-0.174	0.026	0.035	0.127	-0.014
Two children	-0.027	-0.036	-0.021	0.129	-0.045
Three children	-0.068	-0.027	0.022	0.081	-0.008
More than three children	-0.093	0.025	-0.014	0.068	0.014
Age of current marriage female	0.008 ~	-0.005	-0.002	-0.004	0.003
Parental education					
Male's father highly educated	0.094 *	-0.065	0.034	-0.036	-0.028
Male's mother highly educated	-0.030	0.017	0.079	-0.044	-0.021
Female's father highly educated	-0.023	-0.007	0.003	0.025	0.003
Female's mother highly educated	0.012	0.102 ~	0.061	-0.110	-0.065

~p<0.10; *p<0.05; **p<0.01; ***p<0.001

Note: the average marginal effects refer to the probability to be in a specific cluster relative to all other clusters.

Source: FSDP 1998, 2000, 2003 and 2009.

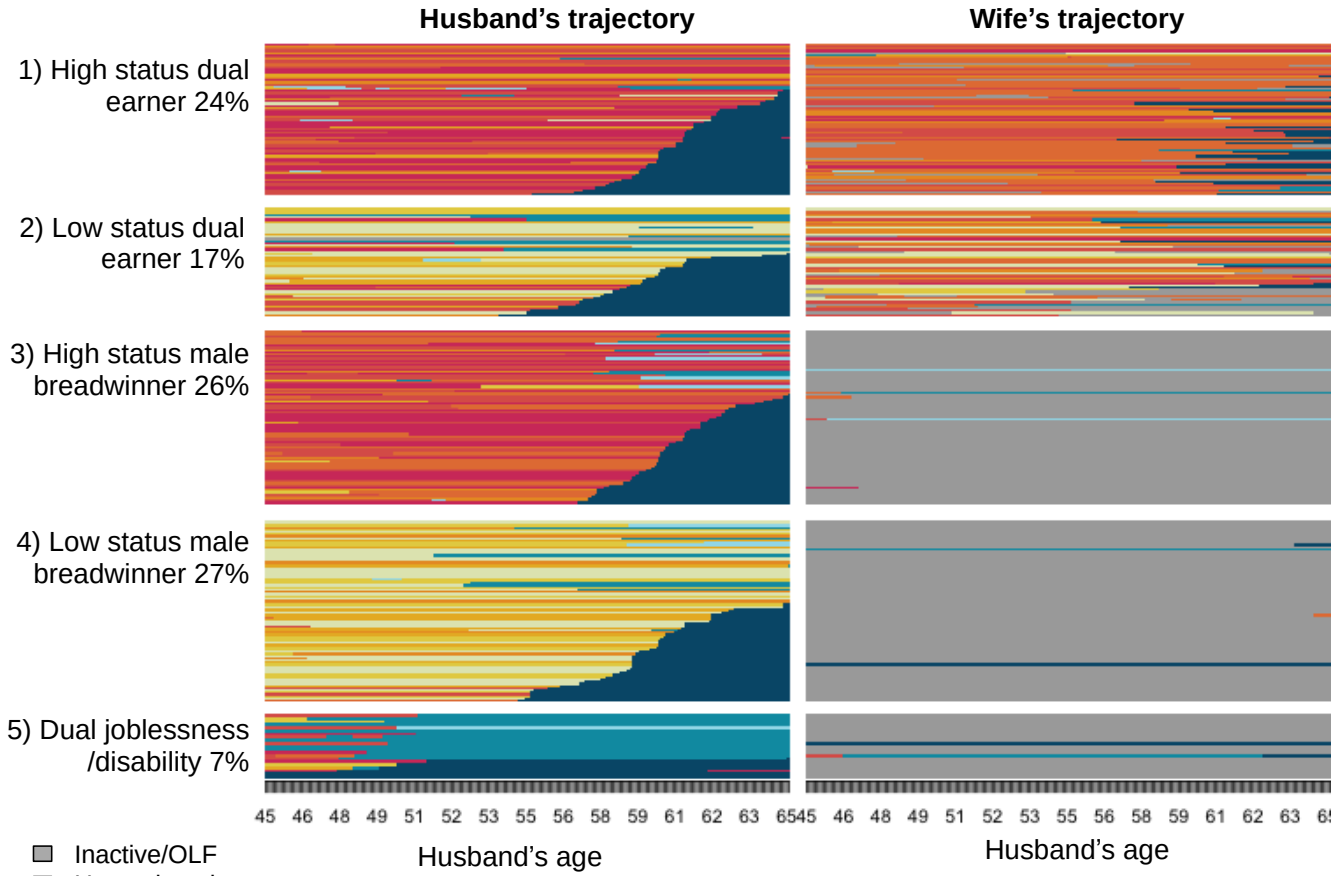

Figure 1: Sequence index plots of couples' late-life employment clusters

Note: the male and female sequences are sorted by husband's retirement timing. The female sequences are specified as her employment status at a given age of her husband to show the concurrent employment status of both partners. Therefore, the female sequences are plotted on the timeline of the age of her husband.

Source: FSDP 1998, 2000, 2003 and 2009.